

OPTICAL DEVICE FOR DETECTING THE PRINTING MEDIA IN PRINTERS

FIELD OF THE INVENTION

The present invention relates to an optical device for detecting the presence of media, which can be used in several hard copy devices, such as for instance copiers, scanners, facsimile machines, or printers of various types, bringing characteristics of novelty and inventive activity with respect to the prior art.

BACKGROUND OF THE INVENTION

The present invention is applicable in particular, to large-format printers, also known as "plotters", which are intended, in particular, for printing on continuous or sheet-like printing media usually printing paper. These printers are computer-controlled and print on a printing media which is moved through the printer, being acted on by an ink-jet printing cartridge which moves transversely relative to the movement of the printing media.

Printers of this type incorporate detectors for detecting the passage of the printing media in order to obtain therefrom a signal which indicates the presence or absence of the printing media, this signal being used by the printer for many processes in accordance with the programs stored in the electronic control unit of the printer.

Currently, printers which have a detector situated at the input for the printing media on its path towards paper-feed rollers which transport it along its path through the printer are known, the substrate normally being paper either in roll form, that is, continuous paper, or in sheet form. The currently-known devices for detecting the presence of the printing media are mounted in the lower portion of the paper input, that is, the portion which corresponds to the paper-input platen, and have a detector lever which points upwards and can pivot on an intermediate pivot pin upon the passage of the front edge of paper coming from the roll incorporated in the printer itself, or of separately-fed sheets. This system has certain disadvantages, amongst which may be cited: the fact that the lever for detecting the presence of the sheet of paper is affected by oscillations and takes a certain time to stop again owing to natural damping after it has been inclined by the action of the edge of the paper or of the sheet of paper. This is a source of delays in the processes for interpreting the signal in the printer and therefore of delay in the processes generated on the basis of the said detection.

Another disadvantage is that, when these printers operate in a manner such that the sheet or roll of paper is guided towards the interior of the printer, being guided around a main roller and passing towards the rear, towards the print region forming, as a whole, a U-shaped loop, the end of the pivoting lever of the paper detector contacts the face which will subsequently receive the printing, which is inadvisable since, in certain cases, the contact of the lever may produce marks on the paper which impair the printing carried out or even render it unusable.

SUMMARY OF THE INVENTION

The present invention is intended to solve the problems of the prior art, disclosing means for ensuring that the printing-media detection lever does not suffer oscillations at the moment when it regains its position after the passage of the rear edge of the sheet of paper or of a portion of the roll, preventing the problems brought about by the delay generated by the said oscillation.

At the same time, the present invention provides for means for detecting the presence of the sheet of paper, the means being disposed above the paper support in the region in which the paper enters the machine, so that the detector lever acts on the rear face of the printing media and there will therefore be no adverse effect on the face which is subject to printing, as is the case at the moment.

To achieve its objects in order for the pivoting lever for detecting the presence of the printing media to regain its rest position after its operation without oscillations, the present invention provides for the creation of a pivoting element which is intended to detect the presence of the sheet of paper and is guided by two pivots rotatable in respective arcuate grooves arranged symmetrically relative to one another and terminating at a common point, in a manner such that each of the two guide grooves coincides with an arc of a circle described from each of the two pivots of the pivoting element when they are in the rest position. Moreover, the body of the said pivoting element has the two pivots in the vicinity of its upper edge, a first, lower extension extending from the pivoting element in order to interfere with the path of the edge of the laminar printing media and the body having a second, lateral extension which is intended to coincide with the path of the control light-beam. With this arrangement, the centre of gravity of the pivoting element is disposed below both pivots in the rest position so that, when the said pivoting element regains the initial rest position, its position is determined by the pivoting element contacting the base of the curved groove by means of the pivot which is moving along the same. The pivoting element thus takes up its rest position without oscillation at the end of its travel.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding, a set of drawings corresponding to a preferred embodiment of the present invention is appended, by way of non-limiting example.

FIG. 1 is a simplified cross-section which shows the guide plate for the input of the printing media, the printing-media detector, and the feed and guide rollers in a conventional printer.

FIG. 2 is a sectioned view equivalent to FIG. 1 showing a printer incorporating the present invention.

FIGS. 3 to 10 are schematic side elevational views showing the pivoting element of a device for detecting the laminar printing media of a printer in accordance with the present invention.

FIG. 11 shows a cross-section taken in the section plane indicated in FIG. 3.

DETAILED DESCRIPTION OF THE INVENTION

As will be appreciated from FIG. 1, in a currently-known printer, the printing media, in the form of paper 1 in roll or sheet form, is supplied to the entrainment and guide head 2 of the printer, sliding over the support platen 3 and passing to the entrainment roller 4, which grips the printing media, together with the main cylinder 5, the substrate passing in front of the printing-media detection device 6 which has the pivoting lever 7 on the path of the paper, the said lever acting on the lower face of the printing media 1 with reference to the position of the paper shown in the drawing. The printing media 1 is protected from above by the front guide structure 8 for guiding the printing media on its descent and by the support 9 of the upper guide roller 10.

This arrangement has the disadvantages explained above that the pivoting lever 7 oscillates and that the end of the